



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,563	05/03/2001	David M. Pepper	B-3896 617785-5	6818
7590	05/20/2004		EXAMINER	
Richard P. Berg, Esq. c/o LADAS & PARRY 5670 Wilshire Boulevard, Suite 2100 Los Angeles, CA 90036-5679			PHAN, HANH	
			ART UNIT	PAPER NUMBER
			2633	6
DATE MAILED: 05/20/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/848,563	PEPPER, DAVID M.
Examiner	Art Unit	
Hanh Phan	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 03 May 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-68 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2, 3, 5</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 11, 12, 16-18, 36-40, 45, 46, 51, 54, 55, 58, 63 and 65-68 are rejected under 35 U.S.C. 102(b) as being anticipated by Pepper (US Patent No. 5,046,824) cited by applicant.

Regarding claims 1, 11, 16, 37, 45, 54 and 68, referring to figures 1-5, Pepper discloses a method of optically interconnecting a first station to a second station by coupling a first optical beam and a second optical beam, the first optical beam originating from the first station and being directed to the second station, the second optical beam originating from the second station and being directed to the first station, the method comprising the steps of:

providing a first adaptive optical module (2) and a second adaptive optical module (8)(Figs. 1-5);

disposing the first adaptive optical module (2) in a path of the first beam for reflecting and directing the first beam to the second adaptive optical module (8) (Fig. 1); and

reflecting the second beam received from the second adaptive optical

module (8), and directing the second beam to the first station (Fig. 1); and disposing the second adaptive optical module (8) in a path of the second beam for

reflecting and directing the second beam to the first adaptive optical module (Fig. 1); and reflecting the first beam received from the first adaptive optical module, and

directing the first beam to the second station (see from col. 3, line 25 to col. 7, line 48).

Regarding claims 2, 17, 18, 36, 38, 46, 55 and 65, Pepper further teaches the step of compensating for propagation errors and wherein the first and second optical modules function in a closed-loop fashion (Figs. 1-4).

Regarding claims 12 and 58, Pepper further teaches the step of correcting propagation distortions of the first and second optical beams includes a step of planarizing the wavefronts of the first and second optical beams, the step of planarizing the first and second optical beams being carried out by at least one adaptive optical module, the at least one adaptive optical module functioning in a closed-loop fashion (Fig. 5).

Regarding claims 39 and 40, Pepper further teaches at least one of the first and second adaptive optical modules (2, 8)(Fig. 1) comprises an adaptive optical wavefront corrector and a wavefront error sensor (i.e., an adaptive optical wavefront corrector 4 and a wavefront error sensor 6, Fig. 1).

Regarding claims 51 and 63, Pepper further teaches the adaptive optical modules (2, 4)(Fig. 1) comprise LCLVs, liquid crystal SLMs, deformable MEMS devices, optical MEMS-based SLMs, or liquid crystal cell with transparent electrodes, or any combination thereof.

Regarding claims 66 and 67, Pepper further teaches the first and second stations comprise at least one transceiver (Figs. 1-4).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-10, 13-15, 19-35, 41-44, 47-50, 52, 53, 56, 57, 59-62 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pepper (US Patent No. 5,046,824 cited by applicant) in view of Salmon (US Patent No. 5,745,309).

Regarding claims 3, 4, 9, 13, 19-21, 33, 41, 47, 52, 56, 57 and 64, Pepper differs from claims 3, 4, 9, 13, 19-21, 33, 41, 47, 52, 56, 57 and 64 in that he fails to teach an optical tilt-focus error compensator. However, Salmon teaches an optical tilt-focus error compensator (Fig. 1, col. 2, lines 1-65, col. 3, lines 1-67 and col. 4, lines 1-32 and 50-67 and col. 5, lines 1-67). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the optical tilt-focus error compensator as taught by Salmon in the system of Pepper. One of ordinary skill in the

art would have been motivated to do this since Salmon suggests in column 2, lines 1-65, col. 3, lines 1-67 and col. 4, lines 1-32 and lines 50-67 and col. 5, lines 1-67 that using such an optical tilt-focus error compensator has advantage of allowing removing overall tilt and focus errors between the first and second beams so that the beams propagate in exact opposite to each other within the system.

Regarding claims 5, 6, 10, 22, 23, 25, 27, 34, 42, 48 and 53, the combination of Pepper and Salmon teaches at least one of the first and second adaptive optical modules (2, 8)(Fig. 1 of Pepper) comprises an adaptive optical wavefront corrector and a wavefront error sensor (i.e., adaptive optical module 2 comprises an adaptive optical wavefront corrector 4 and a wavefront error sensor 6, Fig. 1).

Regarding claims 7, 26, 28, 49 and 50, the combination of Pepper and Salmon teaches the step of reflecting and directing the first beam to the second adaptive optical module, is carried out by the first adaptive optical wavefront corrector;

after reflecting of a corrected first beam by the first adaptive optical wavefront corrector,

a first part of the corrected first beam is directed to the first wavefront error sensor;

the first wavefront error sensor senses a distortion of the first beam, computes a correction, and addresses the first adaptive optical wavefront corrector to reduce the distortion of the first beam by producing the corrected first beam after reflection of the first beam by the first adaptive optical wavefront corrector ;

after correction of the first beam, and reflection and directing of the corrected first beam by the first adaptive optical wavefront corrector, a second part of the corrected first beam is directed to the second adaptive optical wavefront corrector;

the second adaptive optical wavefront corrector reflects and directs the corrected first beam to the second station;

the step of reflecting and directing the second beam to the first adaptive optical module, is carried out by the second adaptive optical wavefront corrector; after reflecting of a corrected second beam by the second adaptive optical wavefront corrector, a first part of the corrected second beam is directed to the second wavefront error sensor;

the second wavefront error sensor senses a distortion of the second beam, computes a correction, and addresses the second adaptive optical wavefront corrector to reduce the distortion of the second beam by producing a corrected second beam after reflection of the second beam by the second adaptive optical wavefront corrector ; after correction of the second beam, and reflection and directing of the corrected second beam by the second adaptive optical wavefront corrector, a second part of the corrected second beam is directed to the first adaptive optical wavefront corrector; and

the first adaptive optical wavefront corrector reflects and directs the corrected second beam to the first station (Figs. 1-4 of Pepper, see from col. 3, line 25 to col. 7, line 48 and see Fig. 1 of Salmon).

Regarding claims 8 and 32, the combination of Pepper and Salmon teaches the adaptive optical modules comprise LCLVs, liquid crystal SLMs, deformable MEMS

devices, optical MEMS-based SLMs, or liquid crystal cell with transparent electrodes, or any combination thereof (i.e., adaptive optical modules 2 and 8 comprises LCLVs of Pepper).

Regarding claims 14, 31, 44 and 62, the combination of Pepper and Salmon teaches the information is encoded onto the first optical beam at the first station, information is encoded onto the second optical beam at the second station, and wherein the first optical beam arrives at the second station as a diffraction-limited beam and delivers to the second station the information encoded onto the first optical beam at the first station, and the second optical beam arrives at the first station as a diffraction-limited beam and delivers to the first station the information encoded onto the second optical beam at the second station (Figs. 1-4 of Pepper and Fig. 1 of Salmon).

Regarding claims 15 and 35, the combination of Pepper and Salmon teaches the first and second stations comprise at least one transceiver (not shown) (Figs. 1-4 of Pepper and Fig. 1 of Salmon).

Regarding claims 24, 59 and 60, the combination of Pepper and Salmon teaches further comprising:

a first beam splitter (24)(Fig. 1 of Pepper) for splitting the first beam, the first beam sputter being disposed in a light path between the first and second adaptive optical modules; and

a second beam splitter (62)(Fig. 1) for splitting the second beam, the second beam splitter being disposed in a light path between the first and second adaptive optical modules.

Regarding claims 29, 30, 43 and 61, the combination of Pepper and Salmon teaches further propagation error correction includes planarizing at least one of the first and second optical beams (Fig. 5 of Pepper and Fig. 1 of Salmon).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Brown, Jr. et al (US Patent No. 5,051,571) discloses cascade adaptive optics system.

Cheng et al (Us Patent No. 6,577,421) discloses alignment system.

Friedman et al (US Patent No. 6,278,100) discloses optical system.

Wirth (Pub. No. US 2002/0030824 A1) discloses method and apparatus for wavefront measurement.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (703)306-5840.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

Hanh Phan
Patent Examiner
Art Unit 2633
Mayhan
05/14/04